

**ABSTRACT**

A high density RF plasma source uses a special antenna configuration to launch waves at frequencies such as 13,56MHz. The tunability of this antenna allows one to adapt actively the coupling of the RF energy into an evolutive plasma as found in plasma processing in semiconductor manufacturing. The plasma source can be used for plasma etching, deposition, sputtering systems, space propulsion, plasma based sterilization, and plasma abatement systems. Also, the plasma source can be used with one or several process chambers, which comprise an array of magnets and RF coils too. These elements can be used for plasma confinement or active plasma control (plasma rotation) thanks to a feedback control approach, and for in situ NMR monitoring or analysis such as moisture monitoring inside a process chamber, before or after the plasma process, or for in situ NMR inspection of wafers or others work pieces.